

WHAT IS CLAIMED IS:

1. An apparatus for quantifying a rapid immunochromatographic test, comprising:
 - 5 an image acquiring unit including optical image acquiring devices for acquiring a digital image of a rapid immunochromatographic test;
a characteristics acquiring unit for selectively acquiring at least one characteristics of a digital image of a rapid immunochromatographic test according to a series of digital image processing procedures;
 - 10 a neural-network quantifying unit including a plurality of plastic perception sub-networks each used for quantifying main characteristics of a rapid immunochromatographic test according to an algorithm of back propagation;
a storage unit for storing a plurality of parameters therein, which include
15 a plurality of characteristics related values, a plurality of weights and a plurality of critical values of the plastic perception sub-networks, and system related parameters; and
an output unit for displaying results of the quantification performed by the neural-network quantifying unit;
 - 20 thereby capable of acquiring main characteristics of a rapid immunochromatographic test through the optical image acquiring devices, quantifying the main characteristics through the neural-network quantifying unit, and displaying results of

quantification through the output unit.

2. The apparatus for quantifying a rapid immunochromatographic test as claimed in claim 1, wherein the main characteristics of a rapid immunochromatographic test include test line, and control line, which
5 are quantifiable image characteristics of a rapid immunochromatographic test.
3. The apparatus for quantifying a rapid immunochromatographic test as claimed in claim 1, wherein the plastic perception sub-networks are built through a plurality of weights and critical values.
- 10 4. The apparatus for quantifying a rapid immunochromatographic test as claimed in claim 1, wherein the image acquiring unit is a charge coupled devices (CCD)/complementary metal-oxide semiconductor (CMOS) image acquiring device.
5. The apparatus for quantifying a rapid immunochromatographic test as
15 claimed in claim 1, wherein the image acquiring unit is an optical scanning device.
6. The apparatus for quantifying a rapid immunochromatographic test as claimed in claim 1, wherein the characteristics acquiring unit processes and calculates through a microprocessor capable of carrying
20 out high speed logical arithmetical operation.
7. The apparatus for quantifying a rapid immunochromatographic test as claimed in claim 1, wherein the characteristics acquiring unit processes and calculates through a digital signal processor.

8. The apparatus for quantifying a rapid immunochromatographic test as claimed in claim 1, wherein the neural-network quantifying unit processes and calculates through a microprocessor capable of carrying out high speed logical arithmetical operation.
- 5 9. The apparatus for quantifying a rapid immunochromatographic test as claimed in claim 1, wherein the neural-network quantifying unit processes and calculates through a digital signal processor.
- 10 10. The apparatus for quantifying a rapid immunochromatographic test as claimed in claim 1, wherein the output unit includes a liquid crystal display (LCD), a plurality of light emitting diodes (LED), and a loudspeaker.
- 15 11. The apparatus for quantifying a rapid immunochromatographic test as claimed in claim 1, wherein the characteristics acquiring unit, the neural-network quantifying unit, and the storing unit are integrated into a single integrated circuit platform.
12. A method for quantifying a rapid immunochromatographic test, comprising the steps of:
- (A) preparing a rapid immunochromatographic test to be quantified;
- (B) positioning the test in an image acquiring unit, and acquiring a digital image of the test;
- 20 (C) carrying out initial judgment and differentiation on the digital image of the test for finding out whether quantification of the test should proceed;

(D) acquiring at least one main characteristics of the digital image through a characteristics acquiring unit;

(E) calculating and quantifying the main characteristics of the digital image acquired in step (D) through a neural-network quantifying unit;

5 (F) sending results of the quantification to an output unit.

13. The method for quantifying a rapid immunochromatographic test as claimed in claim 12, wherein the image acquiring unit is a charge coupled devices (CCD)/complementary metal-oxide semiconductor (CMOS) image acquiring device.

10 14. The method for quantifying a rapid immunochromatographic test as claimed in claim 12, wherein the image acquiring unit is an optical scanning device.

15 15. The method for quantifying a rapid immunochromatographic test as claimed in claim 12, wherein in step (C), either one of “normal” condition and “abnormal” condition will be established according to a result of a comparison between shades of colors of a test line and a control line.

20 16. The method for quantifying a rapid immunochromatographic test as claimed in claim 12, wherein in step (D), the main characteristics include test line, and control line.

17. The method for quantifying a rapid immunochromatographic test as claimed in claim 12, wherein in step (D), a storage unit is used for storing a plurality of parameters therein, which include a plurality of

characteristics related values, a plurality of weights and a plurality of critical values of the plastic perception sub-networks, and system related parameters.

18. The method for quantifying a rapid immunochromatographic test as
5 claimed in claim 12, wherein the neural-network quantifying unit has a plastic perception sub-network built therein through a plurality of weights and critical values, and a plurality of characteristics related values are inputted into the plastic perception sub-network for the quantification step.

10 19. The method for quantifying a rapid immunochromatographic test as claimed in claim 12, wherein the output unit includes a liquid crystal display (LCD), a plurality of light emitting diodes (LED), and a loudspeaker.

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